

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A permselective membrane assembly comprising a porous, graded particulate layer, wherein the porous, graded particulate layer is prepared from a plurality of sols having narrow particle size distributions.
2. (Currently amended) The permselective membrane assembly of claim 1, further comprising a porous support and a permselective membrane
3. (Original) The permselective membrane assembly of claim 2 wherein the porous support is selected from the group consisting of alumina, titania, silica, zirconia, perovskites, spinels, pyrochlores, zeolites, stainless steel, and combinations thereof.
4. (Original) The permselective membrane assembly of claim 3 wherein the porous support comprises alumina.
5. (Original) The permselective membrane assembly of claim 2 wherein the permselective membrane is deposited by CVD.
6. (Original) The permselective membrane assembly of claim 2 wherein the permselective membrane comprises silica.

7. (Original) The permselective membrane assembly of claim 2 wherein the permselective membrane comprises nanosil.
8. (Original) The permselective membrane assembly of claim 1 wherein the permeance to hydrogen gas is at least 1×10^{-7} mol/ m² s Pa and the hydrogen permselectivities with respect to carbon dioxide, carbon monoxide and methane are each at least 100.
9. (Original) The permselective membrane assembly of claim 1 wherein the permeance to hydrogen gas is at least 4×10^{-7} mol/ m² s Pa and the hydrogen permselectivities with respect to carbon dioxide, carbon monoxide and methane are each at least 1000.
10. (Cancelled).
11. (Currently amended) The permselective membrane of claim 1 wherein at least one of the sols has an average particle size of greater than 500 nm and at least one of the sols has an average particle size less than 100 nm.
12. (Currently amended) The permselective membrane of claim 1 wherein the plurality of sols are comprised of alumina particles.
13. (Currently amended) A method for promoting the yield of a gaseous reaction product by selective permeation using a permselective membrane assembly comprising a porous, graded particulate layer, wherein the porous, graded particulate layer is prepared from a plurality of sols having narrow particle size distributions.
14. (Original) The method of claim 13 wherein the gaseous reaction product is hydrogen.

15-47. (Cancelled).

48. (New) The permselective membrane of claim 1 wherein at least one of the plurality of sols comprises a boehmite sol and a binder-containing solution and wherein the boehmite sol is produced by a method comprising:

hydrolyzing an aluminum-containing precursor at conditions sufficient to form an aluminum-containing intermediate;

peptizing the aluminum-containing intermediate with an acid at conditions sufficient to form a colloid; and

aging the colloid at conditions sufficient to form the sol.

49. (New) The permselective membrane of claim 1 wherein the porous, graded particulate layer has a thickness in the range of 200 nm and 2,000 nm.

50. (New) The permselective membrane of claim 1 wherein the porous, graded particulate layer has a thickness in the range of 400 nm and 1,800 nm.

51. (New) The permselective membrane of claim 1 wherein the porous, graded particulate layer has a thickness in the range of 500 nm and 1,500 nm.

52. (New) The permselective membrane of claim 1, further including a silica layer on said porous, graded particulate layer.